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Advantages of Using Innovative Technologies in Teaching the Laws of Dynamics in Physics Lessons

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Abstract: This article describes ways and problems of improving the educational process, modeling physics lessons, and the main features of computer-based teaching technology. In addition, the advantages of using virtual laboratories and the modeling of physical phenomena in the Visual Basic program are analyzed.

Keywords: Dynamics, innovation, advantage, experience, acceleration, closed system, body.

The branch of mechanics that studies the movement of bodies along with the cause of this movement is called ***dynamics.*** The basis of dynamics is determined by 3 laws. These laws were determined by the English scientist I. Newton. That is why they are also called **Newton's laws**.

Newton's first law is about the mechanical state of bodies moving without external influence. This law can be stated as follows: ***a body at rest or moving in a rectilinear plane will maintain its state of rest or motion in a rectilinear plane unless acted upon by other bodies or if their influence is compensated for.***

Newton's 2nd law relates the change in velocity of an object to the force acting on it. In this case, force is considered as a physical quantity that characterizes the interaction of bodies. Experiment shows that if we affect different objects with the same force, they will get different accelerations, the reason for this is that they have different masses. Therefore, Newton's 2nd law can be written as:

$$F = m * W \qquad (6.9)$$

In this F - power, m - body mass, W - acceleration.

According to this equation, force is a vector quantity, but mass is a scalar quantity. In this law, mass means the body's ability to resist accelerating forces, that is, it represents its inertia. The unit of mass is called the kilogram in the ISU. Kuch birligi ***(6.9)*** formula asosida aniqlanadi va ***Nyuton*** deb ataladi. Kuch birligi qilib shunday kuch olinadi-ki,u ***1kg*** massali jismga $1m/s^2$ tezlanish beradi, ya'ni $1N = 1kg \cdot 1m/s^2$.

The unit of force is determined based on the formula ***(6.9)*** and is called Newton. The unit of force is the force that accelerates ***1m/s2*** to a body with a mass of 1kg, i.e. ***1N=1kg 1m/s2.***

Let's look at the main view of Newton's 2nd law.

$$W = \frac{dV}{dt} \qquad (6.10)$$

Mass multiplied by speed is called ***impulse.***

$$p = m * V \qquad (6.12)$$

Newton's 3rd law can be stated as follows: ***If body B acts on body A with a force F1, then body A acts on body B with a force F2, where the forces F1 and F2 are equal and opposite to each other. grumbled***

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$$F = -F \qquad (6.13)$$

The most important thing in this law is that the forces F1 and F2 act on different bodies, that is, not on the same body. In mechanics, when we see the movement of bodies, we see a situation where bodies interact internally and cannot interact with external bodies.

Looking at such bodies as a ***closed system***, we see that the law of conservation of momentum is fulfilled. The definition of this law is as follows: ***the vector sum of impulses of bodies externalizing a closed system remains unchanged at all times of movement***.

To learn the above-mentioned laws of dynamics on a computer, we will create an animation program as follows:

Private Sub Command1_Click()

A program for studying Newton's second law

Im1.Visible = True: Im2.Visible = False: Im3.Visible = False 'Carriage images P1.Cls: P1.FontSize = 12: P1.ForeColor = vb Blue ' font sizes and color P1.Print "Experiment 1, Acting force: F, mass: m=100 g"

For t = 1 To 34

Im1.Left = Im1.Left + t * t For j = 1 To 3000000: Next jNext t

P1.Print " Space: S=45 sm, Time: t=4.2 s, Velocite: a=5 sm/s2"

End Sub

Private Sub Command2_Click()Im2.Left = 0: Im2.Top = 1680

Im1.Visible = False: Im2.Visible = True: Im3.Visible = False P1.Cls: P1.FontSize = 12: P1.ForeColor = vbBlue

P1.Print " 2-tajriba, Affective power: 2F, mass: m=100 g"

For t = 1 To 34

Im2.Left = Im2.Left + t * t For j = 1 To 2000000: Next jNext t

P1.Print " Space: S=45 sm, Time : t=3 s, Velocite: a=10 sm/s2"

End Sub

Private Sub Command3_Click()Im3.Left = 0: Im3.Top = 1500

Im1.Visible = False: Im2.Visible = False: Im3.Visible = True P1.Cls: P1.FontSize = 12: P1.ForeColor = vbBlue

P1.Print "

Experiment 3, Impact Force: 2F, mass: m=200 g

"For t = 1 To 34 Im3.Left = Im3.Left + t * t For j = 1 To 3000000: Next jNext

P1.Print " Space: S=45 sm, Time: t=4.2 s, Velocite: a=5 sm/s2"

End Sub

Private Sub Command4_Click()

RTF1.FileName = "Conclusion”.rtf"End Sub

Private Sub Command5_Click()RTF1.FileName = "1.rtf"

End Sub

Private Sub Command6_Click()RTF1.FileName = "2.rtf"

End Sub

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Private Sub Command7_Click()RTF1.FileName = "3.rtf"

End Sub

Private Sub Command8_Click() RTF1.FileName = "Adabiyotlar.rtf"End Sub

Private Sub Timer1_Timer()Text1.Text = Time

End Sub

When the program starts, the screen will look like this:

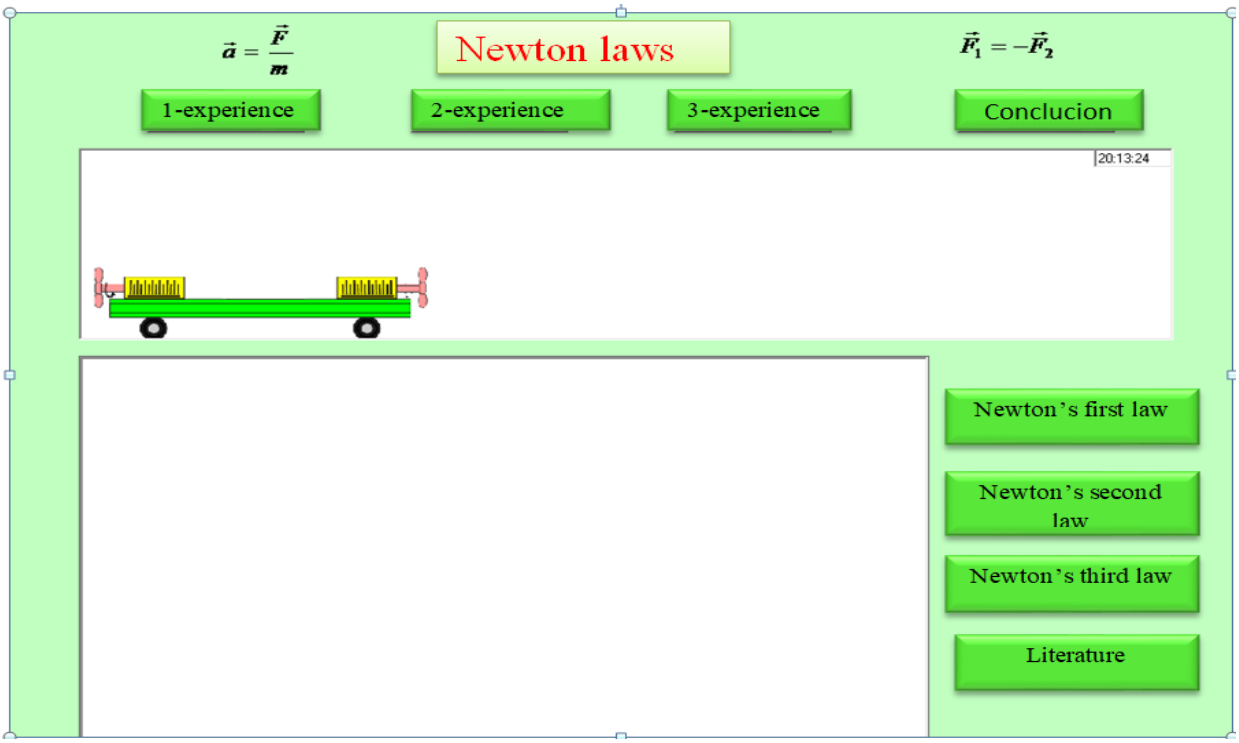

Figure 6.8. A program for studying the laws of dynamics

The program is designed to check Newton's second law, that is, to show that the acceleration received by an object (cart) is directly proportional to the force acting on it, and inversely proportional to the mass of the object. The program also provides an opportunity to get information about Newton's laws and get acquainted with additional literature.

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